

CLAIMS

What is claimed is:

- 1 1. A method for alerting animals to prevent animal-vehicle crashes, comprising:
2 projecting from a moving vehicle a sound pattern comprising a plurality of randomly
3 selected different groups of audible sounds separated by first silent periods between
4 the groups of sounds, wherein each group of sounds includes one or more sounds in
5 an audible frequency range.
- 1 2. The method of Claim 1 wherein a ratio of a duration of the groups of sounds to
2 a ratio of a duration of the first silent periods is less than 1:1.
- 1 3. The method of Claim 1 wherein at least one of the plurality of different groups
2 of audible sounds includes a plurality of sounds at different audible frequencies.
- 1 4. The method of Claim 3 wherein at least one of the plurality of different groups
2 of audible sounds includes a plurality of sounds at different audible frequencies
3 separated by second silent periods between the sounds within the group of sounds,
4 said second silent periods having a duration similar to the duration of the sounds
5 included in the group of sounds.
- 1 5. The method of Claim 4 wherein a duration of the first silent periods is longer
2 than a duration of the second silent periods.
- 1 6. The method of Claim 1 wherein the groups of sounds include sounds in the
2 audible frequency range of 1 kHz to 10 kHz.
- 1 7. The method of Claim 6 wherein the groups of sounds include sounds in the
2 audible frequency range of 1 kHz to 5 kHz.
- 1 8. The method of Claim 1 comprising additionally determining a speed of the
2 moving vehicle and adjusting a volume of the sound pattern projected from the
3 moving vehicle based on the determined speed of the moving vehicle.
- 1 9. The method of Claim 8 comprising automatically initiating the projection of
2 the sound pattern from the moving vehicle when the determined speed of the moving
3 vehicle exceeds a selected threshold speed and automatically terminating the

4 projection of the sound pattern from the moving vehicle when the determined speed
5 of the moving vehicle is less than the selected threshold speed.

1 10. The method of Claim 8 wherein determining a speed of the moving vehicle
2 includes determining a speed of the moving vehicle from an on-board vehicle
3 computer.

1 11. The method of Claim 1 comprising additionally determining a location of the
2 moving vehicle and automatically adjusting the sound pattern projected from the
3 moving vehicle in response to the determined location of the moving vehicle.

1 12. The method of Claim 11 wherein determining a location of the moving vehicle
2 includes determining a location of the moving vehicle using a global positioning
3 system.

1 13. An animal alerting device adapted for mounting on a vehicle to prevent
2 animal-vehicle crashes, comprising:
3 a speaker;
4 a driver circuit coupled to the speaker for driving the speaker in response to
5 sound generation control signals received thereby; and
6 a control circuit coupled to the driver circuit and adapted to generate the sound
7 generation control signals for producing via the driver circuit and speaker a sound
8 pattern comprising a plurality of randomly selected different groups of audible sounds
9 separated by first silent periods between the groups of sounds, wherein each group of
10 sounds includes one or more sounds in an audible frequency range.

1 14. The animal alerting device of Claim 13 wherein the control circuit includes a
2 microprocessor and memory, wherein the memory includes data defining a plurality
3 of different groups of audible sounds, and wherein the microprocessor is programmed
4 to select randomly from among the data defining the plurality of different groups of
5 audible sounds to generate the sound generation control signals.

1 15. The animal alerting device of Claim 13 wherein a ratio of a duration of the
2 groups of sounds to a duration of the first silent periods is less than 1:1.

- 1 16. The animal alerting device of Claim 14 wherein the data defining a plurality of
2 different groups of audible sounds defines at least one of the plurality of different
3 groups of sounds including a plurality of sounds at different audible frequencies.
- 1 17. The animal alerting device of Claim 16 wherein the data defining at least one
2 of the plurality of different groups of audible sounds includes data defining at least
3 one of the plurality of different groups of sounds including a plurality of sounds at
4 different audible frequencies separated by second silent periods between the sounds
5 within the group of sounds, said second silent periods having a duration similar to a
6 duration of the sounds included in the group of sounds.
- 1 18. The animal alerting device of Claim 17 wherein a duration of the first silent
2 periods is longer than a duration of the second silent periods.
- 1 19. The animal alerting device of Claim 13 wherein the groups of sounds include
2 sounds in the audible frequency range of 1 kHz to 10 kHz.
- 1 20. The animal alerting device of Claim 19 wherein the groups of sounds include
2 sounds in the audible frequency range of 1 kHz to 5 kHz.
- 1 21. The animal alerting device of Claim 13 wherein the control circuit is adapted
2 to determine a speed of the vehicle and to adjust a volume of the sound pattern
3 produced from the speaker based on the determined speed of the vehicle.
- 1 22. The animal alerting device of Claim 21 wherein the control circuit is adapted
2 automatically to initiate the production of the sound pattern from the speaker when
3 the determined speed of the vehicle exceeds a selected threshold speed and
4 automatically to terminate the production of the sound pattern from the speaker when
5 the determined speed of the vehicle is less than the selected threshold speed.
- 1 23. The animal alerting device of Claim 21 wherein the control circuit is coupled
2 to an on-board vehicle computer to determine a speed of the vehicle.
- 1 24. The animal alerting device of Claim 23 wherein the control circuit is coupled
2 to an on-board vehicle computer via an OBD-II port connection.

- 1 25. The animal alerting device of Claim 13 wherein the control circuit is adapted
2 to determine a location of the moving vehicle and automatically to adjust the sound
3 pattern produced from the speaker in response to the determined location of the
4 vehicle.
- 1 26. The animal alerting device of Claim 25 wherein the control circuit is coupled
2 to a global positioning system receiver to determine a location of the moving vehicle.
- 1 27. The animal alerting device of Claim 13 wherein the speaker is a piezo-electric
2 speaker.
- 1 28. A method for alerting animals to prevent animal-vehicle crashes, comprising:
2 projecting from a moving vehicle a sound pattern comprising groups of sounds
3 separated by silent periods, wherein each group of sounds includes one or more
4 sounds in an audible frequency range, and wherein a ratio of a duration of the groups
5 of sounds to a duration of the silent periods in the sound pattern is less than 1:1.
- 1 29. The method of Claim 28 wherein the groups of sounds included in the sound
2 pattern include a plurality of different groups of sounds.
- 1 30. The method of Claim 29 comprising additionally including the groups of
2 sounds in the sound pattern in a random sequence.
- 1 31. The method of Claim 28 wherein at least one of the plurality of different
2 groups of sounds includes a plurality of sounds at different frequencies.
- 1 32. The method of Claim 31 wherein at least one of the plurality of different
2 groups of sounds includes a plurality of sounds at different frequencies separated by
3 second silent periods between the sounds within the group of sounds, said second
4 silent periods having a duration similar to a duration of the sounds included in the
5 group of sounds.
- 1 33. The method of Claim 28 wherein the groups of sounds include sounds in the
2 audible frequency range of 1 kHz to 10 kHz.
- 1 34. The method of Claim 33 wherein the groups of sounds include sounds in the
2 audible frequency range of 1 kHz to 5 kHz.

1 35. An animal alerting device adapted for mounting on a vehicle to prevent
2 animal-vehicle crashes, comprising:
3 a speaker;
4 a driver circuit coupled to the speaker for driving the speaker in response to
5 sound generation control signals received thereby; and
6 a control circuit coupled to the driver circuit and adapted to generate the sound
7 generation control signals for producing via the driver circuit and speaker a sound
8 pattern comprising groups of sounds separated by silent periods, wherein each group
9 of sounds includes one or more sounds in an audible frequency range, and wherein a
10 ratio of a duration of the groups of sounds to a duration of the silent periods in the
11 sound pattern is less than 1:1.

1 36. The animal alerting device of Claim 35 wherein the control circuit includes a
2 microprocessor and memory, wherein the memory includes data defining a plurality
3 of different groups of sounds, and wherein the microprocessor is programmed to
4 select randomly from among the data defining the plurality of different groups of
5 sounds to generate the sound generation control signals.

1 37. The animal alerting device of Claim 36 wherein the data defining a plurality of
2 different groups of sounds defines at least one of the plurality of different groups of
3 sounds including a plurality of sounds at different frequencies.

1 38. The animal alerting device of Claim 37 wherein the data defining at least one
2 of the plurality of different groups of sounds includes data defining at least one of the
3 plurality of different groups of sounds including a plurality of sounds at different
4 frequencies separated by second silent periods between the sounds within the group of
5 sounds, said second silent periods having a duration similar to the duration of the
6 sounds included in the group of sounds.

1 39. The animal alerting device of Claim 35 wherein the groups of sounds include
2 sounds in the audible frequency range of 1 kHz to 10 kHz.

1 40. The animal alerting device of Claim 39 wherein the groups of sounds include
2 sounds in the audible frequency range of 1 kHz to 5 kHz.

- 1 41. The animal alerting device of Claim 35 wherein the speaker is a piezoelectric
2 speaker.
- 1 42. A method for alerting animals to prevent animal-vehicle crashes, comprising:
2 (a) projecting from a moving vehicle a sound pattern;
3 (b) determining a location of the moving vehicle; and
4 (c) adjusting automatically the sound pattern projected from the moving
5 vehicle in response to the determined location of the moving vehicle.
- 1 43. The method of Claim 42 wherein the sound pattern comprises a plurality of
2 randomly selected different groups of audible sounds separated by silent periods
3 between the groups of sounds, wherein each group of sounds includes one or more
4 sounds in an audible frequency range.
- 1 44. The method of Claim 42 wherein determining a location of the moving vehicle
2 includes determining a location of the moving vehicle using a global positioning
3 system receiver.
- 1 45. An animal alerting device adapted for mounting on a vehicle to prevent
2 animal-vehicle crashes, comprising
3 (a) a speaker;
4 (b) a driver circuit coupled to the speaker for driving the speaker in
5 response to sound generation control signals;
6 (c) location determining means for determining a location of the vehicle;
7 and
8 (d) a control circuit coupled to the driver circuit and to the location
9 determining means and adapted to generate the sound generation control signals for
10 producing via the driver circuit and speaker a sound pattern and to adjust
11 automatically the sound pattern produced from the speaker in response to the
12 determined location of the vehicle.
- 1 46. The animal alerting device of Claim 45 wherein the location determining
2 means includes a global positioning system receiver.
- 1 47. The animal alerting device of Claim 45 wherein the speaker is a piezo-electric
2 speaker.